

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (currently amended) A chemical compound or composition comprising a peptide, wherein

(a) said ~~which~~ peptide comprises a β -strand-forming section of peptide consisting of four to sixteen consecutive α -D-amino-acid residues and encompassing at least 50% of said peptide; ~~which forms a β -strand having two edges, a first edge which associates with a target β -strand formed by a separate peptide-containing molecule, and a second edge, wherein the β -strand-forming section of peptide comprises a sequence of at least four consecutive α -D-amino-acid residues all of which sterically permit the β -strand-forming section of peptide to form a β -strand, and at least one of which is an $N\alpha$ -substituted α -D-amino-acid residue, and any two successive $N\alpha$ -substituted α -D-amino-acid residues are separated by an odd number of consecutive $N\alpha$ -unsubstituted α -D-amino-acid residues, such that the $N\alpha$ -substituent(s) lie along only the said second edge~~

(b) each of the consecutive α -D-amino acid residues in said β -strand-forming section of peptide has a side chain;

(c) said β -strand-forming section of peptide forms a β -strand having a peptide backbone which takes on the form of an extended ribbon having two edges, a first edge and a second edge, such that the NH and CO components of successive α -D-amino acid residues lie along the alternate edges of the ribbon;

(d) at least one of the $N\alpha$ -atoms within the peptide backbone of the β -strand is $N\alpha$ -substituted with an $N\alpha$ -substituent, such that one or more $N\alpha$ -substituent lie along only the second edge and sterically hinders the association of the second edge with another β -strand; and

(e) the first edge remains free of $N\alpha$ -substituents, and is not prevented from associating with a target β -strand formed by a separate peptide-containing molecule.

2. (currently amended) The A—chemical compound or composition according to claim 1, wherein no two successive N α -substituted α -D-amino acid ~~amino-acid~~ residues in the β -strand-forming section of peptide are separated by more than 3 consecutive N α -unsubstituted α -D-amino acid ~~amino-acid~~ residues.

3. (currently amended) The A—chemical compound or composition according to claim 1 wherein the successive N α -substituted α -D-amino acid ~~α -D-amino-acid~~ residues in the β -strand-forming section of peptide are separated from each other by single N α -unsubstituted α -D-amino acid ~~α -D-amino-acid~~ residues, such that the β -strand-forming section of peptide comprises an alternating sequence of N α -substituted and N α -unsubstituted α -D-amino acid ~~α -D-amino-acid~~ residues.

4. (currently amended) The A—chemical compound or composition according to claim 1 wherein the N α -substituent of each N α -substituted α -D-amino acid ~~α -D-amino-acid~~ residue in the β -strand-forming section of peptide sterically allows or promotes the β -strand-forming section of peptide to form a β -strand, and sterically hinders the association of ~~the—~~said second edge of that β -strand with any other ~~another~~ β -strand.

5. (currently amended) The A—chemical compound or composition according to claim 4, wherein the N α -substituent of each N α -substituted α -D-amino acid ~~α -D-amino-acid~~ residue in the β -strand-forming section of peptide is selected from the group consisting of:

- a fluorine atom or an OH group;
- a group that is connected to the N α atom by an oxygen atom within it;
- a group that is connected to the N α atom by a CH₂ subgroup within it;
- a methyl or ethyl group, or some other alkyl or aliphatic group;
- a substituted or unsubstituted benzyl group, or some other arylmethyl group;

an acetylated or acylated 2-hydroxy-4-methoxybenzyl (AcHmb) group; and

an acylated or unacylated 2-hydroxybenzyl (AcHb/Hb) group.

6. (currently amended) The A—chemical compound or composition according to claim 1, wherein the side chain of each α -D-amino acid ~~α -D-amino acid~~ residue in the β -strand-forming section of peptide allows or promotes the β -strand forming section of peptide to form a β -strand.

7. (currently amended) The A—chemical compound or composition according to claim 6, wherein the side chain of one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide is that of an amino acid ~~amino acid~~ residue having a β -sheet propensity of greater than 1.00.

8. (currently amended) The A—chemical compound or composition according to claim 6, wherein the side chain of any one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of the peptide is selected from the group consisting of:

an atom or group that allows or promotes the β -strand-forming section of the peptide to associate as a β -strand with the target β -strand and thereby form a stable β -sheet complex; and

an atom or group that forms a hydrophobic or electrostatic interaction, hydrogen bond, or other favourable non-covalent interaction with the neighbouring side chain of the target β -strand in a β -sheet complex comprising the target β -strand and the β -strand-forming section of peptide.

9. (currently amended) The A—chemical compound or composition according to claim 6, wherein the side chain of any one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide is selected from the group consisting of:

a hydrophobic group, or a group that has a considerable hydrophobic portion;

a branched or unbranched alkyl or aliphatic group;

a group that is branched at its connecting β -carbon atom;
an aromatic group;
an acidic or basic group; and
an amide- or hydroxyl-containing group.

10. (currently amended) The A—chemical compound or composition according to claim 1, wherein the side chain of one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide hinders the stacking of β -sheets.

11. (currently amended) The A—chemical compound or composition according to claim 10, wherein the side chain of one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide extends beyond the neighbouring side chains in the β -strand.

12. (currently amended) The A—chemical compound or composition according to claim 1, wherein the side chain of one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide contains a detectable group which allows the compound or composition to be traced or detected.

13. (currently amended) The A—chemical compound or composition according to claim 12, wherein the side chain of one or more α -D-amino acid ~~α -D-amino acid~~ residues in the β -strand-forming section of peptide is selected from the group consisting of:

an atom or group that contains a radioactive or magnetically active nucleus;

that of phenylalanine or tyrosine with one or more radioactive or magnetically active iodine or other halogen atoms substituted onto the aromatic ring;

a fluorescent, coloured, or other spectroscopically detectable group;

a group which contains an unpaired electron and thereby acts as a spin label;

a group which contains the 2,2,5,5-tetramethyl-1-pyrrolidinyloxy (PROXYL) group; and

a group which contains the 2,2,6,6-tetramethyl-1-piperidinyloxy (TEMPO) group.

14. (currently amended) The A—chemical compound or composition according to claim 1, wherein the side chain of one or more α -D-amino acid ~~α -D-amino-acid~~ residues in the β -strand-forming section of peptide is selected from the group consisting of the side chain of:

any naturally occurring α -L-amino acid ~~α -L-amino-acid~~ or synthetic derivative thereof; ~~glycine;~~ alanine; serine; cysteine; threonine; valine; leucine; isoleucine; methionine; phenylalanine; tyrosine; tryptophan; glutamine; asparagine; glutamate; aspartate; histidine; lysine; arginine; and

tert-leucine or β -hydroxyvaline.

15. (currently amended) The A—chemical compound or composition according to claim 1 wherein the target β -strand is formed by the Alzheimer's A β peptide, and the β -strand-forming section of peptide binds specifically as a β -strand to part or all of the KLVFFAE sequence of SEQ ID NO: 5 within the target β -strand in the parallel orientation, thereby forming a parallel β -sheet complex wherein consecutive residues of the β -strand-forming section of peptide lie diagonally opposite consecutive residues of the KLVFFAE sequence in the same order.

16. (currently amended) The A—chemical compound or composition according to claim 1 wherein the target β -strand is formed by the Alzheimer's A β peptide, and the β -strand-forming section of peptide binds specifically as a β -strand to part or all of the KLVFFAE sequence of SEQ ID NO: 5 within the target β -strand in the antiparallel orientation, thereby forming an antiparallel β -sheet complex wherein consecutive residues of the β -strand-forming section of peptide lie diagonally opposite consecutive residues of the KLVFFAE sequence in reverse order.

17. (currently amended) The A—chemical compound or composition according to claim 1 wherein the β -strand-forming section of peptide is preceded by, or followed by, or otherwise attached to a distinct membrane-penetrating section of peptide which enables the β -strand-forming section of peptide to cross ~~biological barriers such as cell membranes,~~ and the blood-brain barrier or any other biological barrier.

18. (currently amended) The A—chemical compound or composition according to claim 17 wherein the side chain of each residue in the membrane-penetrating section of peptide is selected from the group consisting of:

a basic or hydrophobic group; and a side chain of alanine, valine, leucine, isoleucine, methionine, phenylalanine, tyrosine, tryptophan, proline, histidine, lysine, or arginine.

19. (currently amended) The A—chemical compound or composition according to claim 1 wherein the β -strand-forming section of peptide has a free or acylated N terminus and a free, or amidated, or esterified C terminus, or forms part of a larger peptide which has a free or acylated N terminus and a free, amidated, or esterified C terminus.

20. (currently amended) The A—chemical compound or composition according to claim 1 wherein the β -strand-forming section of peptide is attached to another functional component.

21. (currently amended) The A—chemical compound or composition according to claim 20, wherein the functional component is selected from the group consisting of:

a component which strengthens the binding of the β -strand-forming section of peptide to the target β -strand;

a component which enhances specificity of association of the β -strand-forming section of peptide with the target β -strand;

a component which enables the β -strand-forming section of peptide to cross ~~biological barriers such as cell membranes, and the blood-brain barrier and other biological barrier;~~

a component which causes the compound/composition to target specific organs, cells, or molecules;

a component which allows the compound/composition to be traced or detected;

an atom or group that contains a radioactive or magnetically active nucleus;

a fluorescent, coloured, or other spectroscopically detectable group;

a group which contains an unpaired electron and thereby acts as a spin label;

a group which contains the 2,2,5,5-tetramethyl-1-pyrrolidinyloxy (PROXYL) group or the 2,2,6,6-tetramethyl-1-piperidinyloxy (TEMPO) group;

a solid matrix, resin, or support;

an enzyme, hormone, antibody, transcription factor, or other protein molecule;

a group that binds specifically to a particular protein; and
a cytotoxic molecule.

22. (currently amended) The A—chemical compound or composition according to claim 20, wherein attachment of the β -strand-forming section of peptide to the functional component is by means of: an amide or ester linkage formed with the C-terminus of the β -strand-forming section of peptide; ~~C-terminal carboxyl group or N-terminal amino group of the full peptide~~ or an amide linkage formed with the N-terminus of the β -strand-forming section of peptide; or an amide linkage formed, or with a carboxyl, or amino, or hydroxyl group of a side chain within the β -strand-forming section of the full peptide; or an ester linkage formed with a carboxyl or hydroxyl group of a side chain within the β -strand-forming section of peptide; or, or by means of a disulphide bridge formed with a thiol group of a side chain within the β -strand-forming section of the full peptide.

23. (currently amended) The A—chemical compound or composition according to claim 1 wherein the β -strand-forming section of peptide comprises between 5 and 10 amino acid ~~amino-acid~~ residues and/or includes a sequence of side chains of amino acid residues of the β -strand-forming section of the peptide that is homologous to or identical to the amino-acid sequence FFVLK of SEQ ID NO: 3 ~~(SEQ. ID. NO. 3)~~.

24. (currently amended) The A—chemical compound or composition according to claim 1 wherein the β -strand-forming section of peptide associates with a target β -strand comprising the amino-acid sequence KLVFF of SEQ ID NO: 1 ~~(SEQ. ID. NO. 1)~~.

25. (currently amended) The A—chemical compound or composition according to claim 1 comprising one or more components which mimic the structure and action of said β -strand-forming section of the peptide, ~~in addition to or instead of said β -strand-forming section of peptide,~~ wherein the components which mimic the structure and action of the β -strand-forming section of the peptide are formed by replacing one or more of the backbone peptide groups or side-chain groups of amino acid residues of the β -strand-forming section of the peptide by another chemical group of similar stereochemistry and ability to form favourable non-covalent interactions with the target β -strand.

26. (currently amended) The A—chemical compound or composition according to claim 25 wherein:

(a) one or more of the N α -unsubstituted backbone peptide groups (CONH) of the β -strand-forming section of peptide is/are each replaced by any ~~one~~ of the following groups: CSNH (thioamide); COO (ester); CSO or ~~7~~ COS, ~~CSS~~ (thioester); CSS (dithioester); COCH₂ (ketone); CSCH₂ (thioketone); SO₂NH (sulphonamide); SOCH₂ (sulphoxide); SO₂CH₂ (sulphone); SO₂O (sulphonate); and/or ~~wherein~~

(b) one or more N α -substituted ~~N-substituted~~ backbone peptide groups (CON(R)) of the β -strand-forming section of peptide is/are replaced by

one of the following an N- or C-substituted form of one of the following groups: CSN(R) CSNH—(thioamide); COCH(R) COCH₂—(ketone); CSCH(R) CSCH₂—(thioketone); SO₂N(R) SO₂NH—(sulphonamide); SOCH(R) SOCH₂ (sulphoxide); SO₂C(R) SO₂CH₂—(sulphone), wherein R is equivalent to the original N α -substituent; and/or

(c) wherein one or more of the side chains of the β -strand-forming section of peptide is/are each replaced by another group having similar stereochemistry or arrangement of polar and non-polar atoms, similar to that of the replaced side chains, maintaining those particular features which are essential for association with the target β -strand.

27 - 40 (cancelled)

41. (previously presented) A pharmaceutical compound or composition according to claim 1.

42 - 44 (cancelled)

45. (new) The chemical compound or composition according to claim 1, wherein any two successive N α -substituted α -D-amino acid residues are separated by an odd number of consecutive N α -unsubstituted α -D-amino acid residues.